REMARKS

Claims 1-6, all the claims pending in the application, stand rejected. No claims have been amended. New claims 7-11 have been added in order to round out the scope of protection to which Applicant believes he is entitled, in light of the clear distinctions over the prior art.

Specification/Drawings

The Examiner notes that the specification refers to the intermediate layer as "13" but the figures label it as 23. The specification correctly refers to the intermediate layer in the prior art, which is made of SiO_2 (page 4), by the reference number 23. However, the intermediate layer according to the invention, which has unique and expressly recited composition that provides desired optical characteristics, is described by a different number, herein 13. Since the illustration of the invention in Fig. 2 uses the number 23, the Figure will be amended according to the attached draft proposal to change the number 23 to 13. This change should permit the Examiner to withdraw his objection. Approval of the proposed change is respectfully requested.

Claim Rejections - 35 U.S.C. §103

Claims 1-6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Mangat et al (6,596,465) in view of Tong (6,352,803). This rejection is traversed for at least the following reasons.

Independent claims 1 and 3 define the invention as a reflection mask blank or reflection mask, respectively, for EUV exposure, having a substrate, multilayer film formed on the substrate to reflect EUV light, an intermediate layer formed on the multilayer film, and an absorber layer formed on the intermediate layer to absorb the EUV light. The intermediate layer is expressly defined as being formed by a material containing Cr and at least one element selected from the group consisting of N, O, and C. This structure, and the methods related to their production or use, clearly differ from the prior art.

Mangat et al

Mangat et al discloses a lithography mask in which a substrate has formed thereon in order: a radiation reflecting layer 220, a capping layer 230 and a blocking layer 270. The blocking layer 270 is a laminate comprising:

an etch stop layer 240 containing Cr or C and disposed next to the capping layer 230,

a buffer layer 250 containing C or SiON, and

an absorbing/blocking layer 260 containing the material selected from the group consisting of Ta, TaSi, TaN, TaSiN, Cr, CrN, and CrON.

The Examiner admits that there is no intermediate layer, as claimed, that is, a layer with the claimed composition disposed between an absorber layer and an EVU light reflecting layer formed on a substrate. The etch stop layer 240 cannot be the intermediate layer, as it does not have the proper composition. The buffer layer 250 cannot be the intermediate layer for the same reasons. The absorber layer 260, though it has CrN, clearly cannot be disposed between itself and the reflecting layer.

Thus, the Examiner looks to Tong for some teaching or motivation for modifying the etch stop layer 240 in Mangat et al so that it would have the composition of the intermediate layer as claimed..

Tong

Tong discloses a reflection type mask in which a multilayer structure 12, a buffer layer 13, and an absorber pattern 14 are formed on a substrate 11. Tong discloses that Si, Mo, Cr, Mo/Si ML stack, chromium oxynitride, or TaSi is formed on the back surface of the substrate 11 or between the substrate 11 and the multilayer structure 12, as a stress balancing layer for correcting the stress of the multilayer structure. The multilayer structure 12 includes Mo/Si. The Examiner attempts to assert that the stress balancing layer formed between the substrate and multilayer structure 12 would be substitutable for, or added to, the etch stop layer 240 of Mangat et al. The motivation for this substitution appears to be the Examiner's desire to devise a structure like that which is claimed. There can be no other motivation, as there is no teaching or suggestion to make such substitution on a technical basis.

Tong simply discloses chromium oxynitride as a material for use as a stress balancing layer (for correcting the stress of the multilayers) formed on the back surface of the substrate 11 or between the substrate 11 and the multilayer structure 12. Tong does not disclose an intermediate layer comprising the materials specifically recited in claim 1. In particular, Tong does not disclose an intermediate layer formed by a material containing Cr and at least one element selected from the group consisting of N, O, and C , that is disposed between the multilayer film and the absorber layer, as recited in claim 1. Mangat et al does not disclose a need to have stress relieved between its reflection layer 220 and the buffer layer 230, or even the

etch stop layer 240. There certainly is no disclosure of a need for stress relief with respect to stress relief between absorber layer 260 and reflection layer 220. The multiple buffer layers themselves would provide such relief. Thus, there is no motivation in the structure of Mangat et al for adding a stress relieving layer or substituting such layer for etch stop layer 240.

Moreover, Tong itself does not contain any teaching or motivation of applying the material disclosed in Tong to the etch stop layer 240 formed between the layer 260 as a part of the blocking layer and the radiation reflective layer 220 disclosed in Mangat et al. Further, Tong does not even teach that an etch stop layer can or should also have any stress correction function.

Indeed, if the etch stop layer disclosed in Mangat is substituted into Tong and is expected to provide a function of correcting stress of the multilayer structure 12 used in Tong, a significant problem will occur. Specifically, yield and quality will deteriorate.

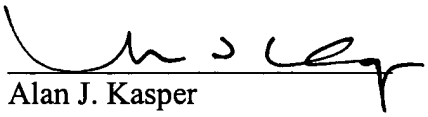
The stress balancing layer disclosed in Tong must be designed to cancel the stress of the multilayer structure. Under this circumstance, if the layer for canceling the stress of the multilayers as disclosed in Tong (e.g., chromium oxynitride) is applied to or in place of the etch stop layer 240 disclosed in Mangat et al, the positioning accuracy of the blocking layer 260 formed thereon is deteriorated. The effect of such substitution on the cap layer 230, which is composed of amorphous silicon, and the important relative arrangement of layer 240, as disclosed at col. 2, lines 29-55, would be significant. Moreover, even with such substitution, the ultimate goals and effect of the present invention, as described in the Summary of the Invention, can not be achieved.

For all of the foregoing reasons, the present invention is clearly patentable over the combination of Mangat and Tong.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Alan J. Kasper
Registration No. 25,426

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